

Appendix F



Prescribed fire is an important tool for reducing hazardous fuels while maintaining refuge grasslands to benefit the primary wildlife resources

Photo courtesy of Kristen Maxfield, USFWS

Fire Management Plan

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FIRE MANAGEMENT PLAN

SHAWANGUNK GRASSLANDS NATIONAL WILDLIFE REFUGE

ULSTER COUNTY, NEW YORK



September 2005

**Shawangunk Grasslands NWR
c/o Walkkill River NWR
1547 County Route 565
Sussex, NJ 07461**

WILDLAND FIRE MANAGEMENT PLAN

Shawangunk Grasslands National Wildlife Refuge

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I. Introduction

A. Need and Reason for the Plan

The Department of the Interior (DOI) fire management policy requires that all refuges with vegetation that can sustain fire must have a Fire Management Plan (FMP) that details fire management guidelines for operational procedures and values to be protected / enhanced. The FMP for the Shawangunk Grasslands National Wildlife Refuge (NWR) will provide guidance on preparedness, wildfire suppression, prescribed fire and non-fire fuels treatments, and prevention in an expanding wildland urban interface (WUI) area. Values to be considered in the FMP include: protection of refuge and neighboring private properties to include structures and improvements, endangered, threatened and special concern species, cultural and historical sites, and enhancement of Refuge habitats. The FMP will be reviewed periodically to ensure the fire program advances and evolves with the U.S. Department of Interior, U.S. Fish and Wildlife Service (FWS), and the Shawangunk Grasslands NWR mission.

B. Fire Management Plan as related to Refuge Management Objectives.

- Uncontrolled wildfire has the potential for negative impacts (out of season, wind events, fire trespass, destruction of real property, burning onto neighboring properties...).
- Prescribed fire and non-fire treatments are an important tool for reducing hazardous fuels while maintaining refuge grasslands to benefit the primary wildlife resources for which the refuge was established to protect, including grassland birds and wintering birds of prey.

C. National Environmental Protection Act (NEPA) Requirements

This plan meets NEPA requirements. A specific Environmental Assessment (EA) will not be completed for this plan. An EA is being developed as part of the Comprehensive Conservation Planning (CCP) process and will address fire management planning to include fire suppression, prescribed fire, and mechanical treatment operations.

Regulations published in the Federal Register (62 FR 2375) January 16, 1997, categorically exclude prescribed fire when used for habitat improvement purposes when conducted in accordance with local and State ordinances and laws. Wildfire suppression and prescribed fire are both categorically excluded, as outlined in 516 DM 2. The Refuge will circulate drafts of this plan to its cooperators and other interested parties for review and comment.

D. Collaborative Development and Implementation Opportunities

Development of the Plan has been a collaborative process with New York Department of Environmental Conservation (NYDEC) and Shawangunk Valley Volunteer Fire Department (VFD). Public involvement in the form of public meetings has been conducted as part of the NEPA process for the refuge CCP which this document will be a step down from. Partner involvement will continue to be critical to implementing successful wildland fire prevention, suppression, prescribed fire, and other non-fire fuels treatments.

E. Authority and Guidance for Implementation

- Protection Act of September 20, 1922 (42 Stat. 857; 16 U.S.C.594): authorizes the Secretary of the Interior to protect from fire, lands under the jurisdiction of the Department directly or in cooperation with other Federal agencies, states, or owners of timber.
- Economy Act of June 30, 1932: authorizes contracts for services with other Federal agencies.
- Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856, 1856a and b): authorizes reciprocal fire protection agreements with any fire organization for mutual aid with or without reimbursement and allows for emergency assistance in the vicinity of agency lands in suppressing fires when no agreement exists.
- Disaster Relief Act of May 22, 1974 (88 Stat. 143; 42 U.S.C. 5121): authorizes Federal agencies to assist state and local governments during emergency or major disaster by direction of the President.
- National Wildlife Refuge System Administrative Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd et seq.: defines the National Wildlife Refuge System as including wildlife refuges, areas for the protection and conservation of fish and wildlife which are threatened with extinction, wildlife ranges, game ranges, wildlife management areas and waterfowl production areas. It also establishes a conservation mission for the Refuge System, defines guiding principles and directs the Secretary of the Interior to ensure that biological integrity and environmental health of the system are maintained and that growth of the system supports the mission.
- Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C.2201): provides for reimbursement to state or local fire services for costs of firefighting on federal property.
- Wildfire Suppression Assistance Act of 1989. (P.L. 100-428, as amended by P.L 101- 11, April 7, 1989).
- Departmental Manual (Interior), Part 910 DM, Chapter 1, Wildfire Suppression Management (March 29, 1990): defines Department of Interior Fire Management Policies.
- National Environmental Policy Act of 1969: regulations implementing the National Environmental Policy Act (NEPA) encourages the combination of environmental comments with other agency documents to reduce duplication and paperwork (40 CFR 1500.4(o) and 1506.4).
- Clean Air Act (42 United State Code (USC) 7401 et seq.): requires states to attain and maintain the national ambient air quality standards adopted to protect health and welfare. This encourages states to implement smoke management programs to mitigate the public health and welfare impacts of Wildland and prescribed fires managed for resource benefit
- Endangered Species Act of 1973.
- Federal Fire Management policy of 1995

II. Relationship to Land Management Planning/Fire Policy

A. Agency Specific Policies Related to Fire Management.

U.S. Fish & Wildlife Service fire policy is tiered to 620 DM 1 of the Departmental Manual (April 1998) and is contained in 621 FW 1 of the Service Manual (February 2000) and the Fire Management Handbook. The following key points summarize the information contained in these manuals:

- Firefighter and public safety is the first priority of the Fire Management Program.
- Only trained and qualified people will conduct fire management duties.
- Trained and certified employees will participate in the wildland fire management program as the situation demands. Agency administrators are responsible and accountable, and will make employees available to participate in the program.
- Fire management activities will be conducted on an interagency basis with the involvement of all partners when appropriate.
- An approved Fire Management Plan must be in place for all of our lands with burnable vegetation.
- We will integrate fire as an ecological process into resource management plans and activities on a landscape scale, across bureau boundaries, based on the best available science.
- We will use wildland fire to meet identified resource management objectives when appropriate and the Fire Management Plan contains such direction.
- We will employ prescribed fire whenever it is an appropriate tool for managing our resources, and will protect against unwanted wildland fire whenever it threatens human life, property, and natural or cultural resources. Once we commit people to an incident, these human resources become the highest value we protect. If we must prioritize between property and natural or cultural resources, we will base the decision on relative protection values, commensurate with fire management costs.
- Regions will provide safe, cost-effective fire management programs in support of land, natural, and cultural resource management plans through appropriate planning, staffing, training, and equipment.
- Management actions we take on wildland fires will consider firefighter and public safety, be cost effective, consider benefits and protection values, and be consistent with natural and cultural resource objectives.

B. Relationship of FMP to Enabling Legislation and Purpose

Shawangunk Grasslands National Wildlife Refuge is managed as an unstaffed satellite of Wallkill River NWR in NJ and is located in the Town of Shawangunk, Ulster County, New York (see Chapter 1, Map 1-1 and 1-2).

The refuge was established in July 1999 through a no-cost transfer of 566 acres of the former Galeville Army Training Facility from the Department of the Army to the U.S. Fish and Wildlife Service. This transfer was authorized under the Federal Property and Administrative Services Act of 1949 (U.S.C. 471531 and other U.S.C. sections), as amended and the Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948 (16 U.S.C. 667d; Public Law 80537), as amended. The purpose of the refuge is to sustain and enhance habitats for grassland dependent migratory birds and wintering raptors.

C. Significant Resources and Values

Audubon New York has identified this site as an “Important Bird Area”, a designation given only to places that support a significant abundance and diversity of birds. In particular, the refuge is among a dwindling number of sites in New York State and one of only two sites in the Hudson Valley large enough to support the entire assemblage of grassland birds. Grassland dependent birds have declined more consistently and over a wider geographic area than any other group of North American birds over the last 30 years. Additionally, the refuge is one of the most important sites for wintering birds of prey in New York, especially northern harrier and short-eared owl.

Several grassland birds that use the refuge are on lists of rare or declining species, including northern harrier, upland sandpiper, short-eared owl, horned lark, bobolink, grasshopper sparrow, Henslow’s sparrow, and vesper sparrow. The Service Northeast Region list of Birds of Conservation Concern includes upland sandpiper, short-eared owl, and Henslow’s sparrow. Partners In Flight lists upland sandpiper, Henslow’s sparrow, and bobolink as high conservation priority species in the Northern Ridge and Valley physiographic region in which the Refuge lies. The North American Bird Conservation Initiative ranks Henslow’s sparrow as a priority species in the Appalachian Mountain Bird Conservation Region. The New York State Department of Environmental Conservation (NYDEC) lists short-eared owl as an endangered species, northern harrier, upland sandpiper, and Henslow’s sparrow as threatened species, and horned lark, grasshopper sparrow, and vesper sparrow as species of special concern.

Several rare or uncommon plants occur on the refuge. Most noteworthy is Frank’s sedge (*Carex frankii*). This species is ranked as endangered by NYDEC and S1 by the New York Natural Heritage Program. Other uncommon plants include small-flowered agrimony (*Agrimonia parviflora*), purple milkweed (*Asclepias purpurascens*), small white aster (*Aster vimineus*), Bush=s sedge (*Carex bushii*), coontail (*Ceratophyllum echinatum*), and watermeal (*Wolffia brazilinsis*).

D. Refuge Management Purpose and Goals.

1. Purpose

The FMP is being co-written with the CCP to ensure it is compatible with the refuge’s purpose to sustain and enhance habitats for grassland dependent migratory birds and wintering raptors.

2. Goals

The primary goals for the refuge under the Service's proposed alternative in the CCP are to:

- Protect and enhance habitats for Federal trust species and other species of special management concern, with particular emphasis on grassland-dependent migratory birds and wintering raptors;
- Manage to enhance regionally-significant ecological communities, including large grassland complexes;
- Promote actions which contribute toward a healthier Wallkill River;
- Continue land acquisition and land management partnerships to support accomplishment of species, habitat, and ecosystem goals;
- Increase opportunities for environmental education and other priority, wildlife dependent public uses;
- Cultivate an informed and conservation-educated public that works to support the goals of the refuge and the mission of the National Wildlife Refuge System;
- Provide refuge staffing, operations, and maintenance support to effectively accomplish refuge purposes and legal mandates.

III. Wildland Fire Management Program Options, Goals, Objectives, and Strategies

A. General Management Considerations

1. The 10-Year Comprehensive Strategy

The National Fire Plan identifies the three core principles of collaboration, priority setting, and accountability. This Plan addresses these principles in the following manner:

Collaboration -

The land area portion of Shawangunk Grasslands National Wildlife Refuge directly abuts or is interspersed with both interagency and private lands. The planning for and implementation of wildland fire management activities will be a collaborative effort with NYDEC- Forest Rangers, Shawangunk VFD, and Town of Shawangunk Government and community representatives.

The refuge recognizes that the key to successful fire management activities (suppression and prevention) lies with the surrounding fire departments. The fire departments provide the closest forces capable of responding safely to a wildland fire incident, since the Refuge itself does not maintain an initial attack suppression force. The Refuge and the Region will continue to support and foster these relationships by encouraging collaborative meetings for training and information sharing, and requesting their input into the fire management decision-making process.

Fire suppression for the Refuge will be covered under several cooperative agreements (Attachment A). The Service agrees to delegate responsibility and authority of Incident Command to the Departments, in consultation with the refuge designated resource advisor, to suppress wildland fires on NWR lands. The Service agrees to reimburse the Departments for suppression costs based on a rate schedule agreed to on an annual basis. The Cooperative agreement is effective for five years from date of signing.

Surrounding Fire Departments that provide for the suppression of all wildland fires at Shawangunk Grasslands NWR.:

Fire Department or District	Agreement	Date
Shawangunk Valley Volunteer Fire Department:		

Priority Setting -

The safety and property of private citizens and incident personnel are paramount concerns. Provided there is minimal threat on human life, suppression methods (direct vs. indirect attack) that impact fragile habitats should be weighed carefully against the need to protect property within and adjacent to the Refuge.

Emphasis of the fire management program will be protection of human life and property, specifically the local community. Other priorities include:

- Protection of watersheds, such as the various tributaries of the Wallkill and Hudson Rivers, from the undesirable effects of wildland fire.
- Hazard fuel treatments to reduce fire prone invasive vegetation and maintenance of roads and trails for equipment access.
- Wildland fire prevention and education programs.

Accountability -

Establish uniform and cost-effective measures, standards, reporting processes, and budget information in implementation plans that will fold into the Government Performance and Results Act (GPRA) process.

2. **Safety**

The Refuge manager and Zone FMO will insure that all fire management actions and activities are completed with safety being the first priority.

3. **Endangered Species Act**

A programmatic section 7 will be completed as part of the Shawangunk Grasslands CCP. All fuels projects and wildland fires should include an assessment of the threat to state and federally-listed endangered, threatened, and special concern species and their habitats from the fire and suppression measures. Any planned activity that could affect a listed or threatened species, a project level section 7 consultation will be conducted.

4. Clean Air Act

Refuge fire management activities which result in the discharge of pollutants (smoke, carbon monoxide, particulate, and other pollutants from fires) are subject to and must comply with all applicable Federal, State, and local air pollution control requirements as specified by Section 118 of the Clean Air Act, as amended 1990. Any planned activity requires a permit from the NYDEC Air Pollution Division through the State Forest Rangers.

5. Clean Water Act

Fire inhibiting chemicals (e.g., aerially applied retardants and Class A foam solutions) may be used with the concurrence of the Refuge Manager. Direct application of these chemicals into waterways such as impoundments, inflows, stream channels, or drainage ditches must be avoided. Federal guidelines implemented in June 2000 require that application of retardants and Class A foams be avoided within a 300 foot buffer zone of waterways.

6. National Historic Preservation Act

Wildfire size-up requires an assessment of the threat to cultural resources from the fire itself or suppression actions. In the event of a new sensitive resource is discovered during any fire activity, the area will be noted and protected from further disturbance. A report will be made and the proper agencies notified. Any preplanned activities causing significant ground disturbance will have a consultation with the Regional Historic Preservation Office.

B. Wildland Fire Management Goals

The goals of the Shawangunk Grasslands NWR fire management program support the goals and objectives of the Refuge as outlined in IL.D., and also support the principles outlined in the USDA/DOI National Fire Plan, 10 Year Comprehensive Strategy, and Cohesive Strategy:

- Ensure firefighter and public safety is the highest priority of all fire and fuels management activities.
- Suppress all wildland fires in a safe and cost effective manner consistent with resources and values at risk.
- Develop and implement a comprehensive non-fire fuels/vegetation management program to reduce hazardous fuels and invasive species.
- Protect sensitive biological communities from the effects of wildfire.
- Utilize Minimum Impact Suppression Tactics (MIST) whenever feasible, commensurate with firefighter safety and resources to be protected to minimize opportunities for invasive species introductions when utilizing heavy equipment on wildfires, or when assessing rehabilitation and restoration needs following wildfire occurrence.
- Collaborate with local, state, and federal partners when planning and implementing wildland fire preparedness, prevention, and suppression actions.

- Educate employees and the public about the scope and effect of wildland fire management, including fuels management, resource protection, prevention, hazard/risk assessment, mitigation and rehabilitation, and fire's role in ecosystem management.
- Identify fire management research needs, work with partners to develop proposals and obtain funding, and apply research results to fire planning through the adaptive management process.

C. Wildland Fire Management Options

Normally a fully-evolved fire management program on Department of Interior lands includes a variety of options for dealing with wildland fire:

- Wildland Fire – Full Suppression.
- Wildland Fire Use - Allow fire to assume its natural role in a fire-adapted ecosystem or to achieve resource benefits.
- Prescribed Fire - Intentionally igniting fire under carefully controlled conditions and according to an approved plan, to achieve a management objective.
- Hazard Fuels Reduction - Reduction of fuel accumulations around structures or other values at risk by mechanical, herbicide, or fire means.

The fire management program at Shawangunk Grasslands NWR will concentrate the following:

- Wildland Fire – Full Suppression.
- Prescribed Fire - Intentionally igniting fire under carefully controlled conditions and according to an approved plan, to achieve a management objective.
- Hazard Fuels Reduction - Reduction of fuel accumulations around structures or other values at risk by mechanical, herbicide, or fire means.

Associated actions needed to take effective wildfire suppression include: preparedness, prevention, and operational planning meetings with cooperators. These will be discussed in some detail later in the Plan.

Wildland fire use is not considered an appropriate fire management option at Shawangunk Grasslands NWR due to urban interface, fuel type, and low frequency of natural caused fire.

D. Fire Management Unit (Zone) (FMU/FMZ)

A Fire Management Unit (FMU) can be defined as “any land management area definable by objectives, management constraints, topographic features, access, values to be protected, political boundaries, fuel types, major fire regime groups, and so on, that set it apart from the management characteristics of an adjacent FMU.” Shawangunk Grasslands NWR is identified as a component of the New England and New York Fire Planning Unit (FPU) which includes all National Park Service, Forest Service, and Fish & Wildlife Service lands in New England and New York for the Fire Program Analysis (FPA).

Shawangunk Grasslands NWR will be managed as a single FMU. Suppression and prescribed fire, and non-fire strategies, management restrictions, fuels, fire environment, and values at risk are similar throughout the Refuge. Wildland fires will be suppressed using the appropriate suppression response. Prescribed fires and non-fire treatments will be used to reduce hazardous fuels and to meet resource and habitat improvement objectives. Due to staff limitations, relatively small land management parcels, valuable resources, and values at risk on neighboring lands, this plan does not recommend wildland fire use as an option.

1. Objectives

- Strive to contain 95% of all fires at one acre or less with no firefighter or public injuries.
- Acquire resources for a maximum response time of one half hour from time fire is reported.
- Employ minimum impact strategies and tactics when possible, with special consideration given to protecting sensitive habitat and biological communities from suppression activities and fire encroachment.
- Utilize prescribed fire and non-fire (mechanical/chemical) treatments to reduce hazardous fuel loadings where appropriate while maintaining habitat and controlling the encroachment of invasive species.
- Prepare and implement an effective fire prevention plan to minimize fires and prevent human-caused wildland fires
- Prepare and present programs to educate the public regarding fire management practices and prevention within the Refuge and system wide.

2. Strategies

- Conduct all fire management programs in a manner consistent with applicable laws, policies and regulations.
- The Incident Commander, working in collaboration with the Refuge Manager or Resource Advisor, will determine the appropriate level of suppression and tactics to be employed based on considerations of human safety, actual and potential fire behavior, values to be protected, access, and expected suppression costs.
- Maintain Cooperative Agreements with the NY DEC and Shawangunk Valley Volunteer Fire Department to promote cooperative prevention and suppression activities. Provide assistance to local or federal cooperators under the “closest resources” principles in accordance with Service policy.
- Identify areas of concern and develop response plans and tactics to expedite the initial attack and full suppression of the fire.
- MIST tactics will be employed to the maximum extent possible, given the considerations of safety, fire behavior, values, access, and cost.

- Use of dozers, skidders, and other heavy equipment will be undertaken only with the consent of the Refuge Manager.
- Avoid use of chemical retardants near waterways and wetland areas.
- Develop a fuels treatment plan annually.
- Utilize prescribed fire as a management treatment for achieving hazard fuel and resource management objectives.
- Initiate cost effective fire monitoring to ensure burn objectives are being met and conduct an investigation into the historical role of fire in the Refuge.
- Use monitoring data to refine burn prescriptions to better achieve objectives.
- Use non-fire mechanical methods, and/or herbicide treatments in combination to reduce hazardous fuels to protect and restore wetlands to enhance habitat for migratory birds.
- In collaboration with local and other partners prepare and implement a fire prevention program to inform the public about wildland fire.
- Integrate fire ecology, management, and prevention themes into existing interpretive and education programs.

3. Fuel/Habitat, Weather, and Fire Behavior Characteristics

a. Fuel/Habitat Types

The generalized Vegetation map (figure 2) and table offers some indication of the Northern Forest Fire Laboratory (NFFL) fuel models are used to estimate potential fire behavior on a more localized scale and corresponding National Fire Danger Rating System (NFDRS) fuel models used for fire danger purposes. Particularly for the NFFL fuel models, this discussion is intended only to give a very generalized idea of the type of fire behavior which can be expected; the actual fuel model appropriate for a given acre of ground requires first hand observation of the conditions present on the scene.

Table 1: Fuel/Habitat Types – Shawangunk Grasslands National Wildlife Refuge

Fuel/Habitat Types	Acres	Percent
Tall Grasslands (NFFL Model 3)	259	46
Short Grasslands (NFFL Model 1)	172	30
Hardwood Forest	135	24
Total	566	100

b. Weather and Climate Patterns

The Hudson River moderates the area's micro-climate, and the Atlantic Ocean influences the overall weather pattern for all of southeastern NY creating a humid, temperate climate. Days below zero degrees and above 100 degrees Fahrenheit (F) are rare. The average frost-free period runs from late April to early October. Precipitation averages about 41 inches annually, and snowfall averages about 51 inches. Rainfall is heaviest during July, August, and September. Prevailing winds are from the northwest during the winter and from the southwest during the summer. Annual wind speed averages 9.3 mph with March the windiest month and July, August, and September the least windy months. Generally, the area's weather diminishes the likelihood of a catastrophic wildfire with its high humidity, moderate rainfall, and relatively calm winds.

c. Fire Season (occurrence) and Fire Danger Indices

The largest number of fires around is in the fall (late Sept. to Dec.) and early spring (Feb. to April). However there is potential for wildland and prescribed fires year-round. No fire history exists for this unit due to the recent acquisition of the property. History is being developed for all fuel treatments occurring. (Attachment B)

National Fire danger Rating System (NFDRS) data is compiled by the NY Department of Environmental Conservation (NYDEC) for daily fire danger levels. Shawangunk Grasslands NWR will use this information to set the daily fire danger levels. No historical weather data is available from a refuge NFDRS weather station. Future historical weather data will be compiled and averaged using the four zone and NY State NFDRS stations

d. Fire Regime

A natural fire regime is a general classification of the role would play across a landscape. The five natural (historical) fire regimes are classified based on the average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. These five regimes include:

- I – 0-35 year frequency, low to mixed severity (<75% overstory replaced)
- II – 0-35 year frequency, high severity (>75% overstory replaced)
- III – 35-100 year frequency, low to mixed severity (<75% overstory replaced)
- IV – 35-100 year frequency, high severity (>75% overstory replaced)
- V – 200+ year frequency, high severity (>75% overstory replaced)

Using the FIREMON v1.1, Fire Regime and Condition Class Field Procedures-Standard & Scorecard Methods, Shawangunk Grasslands NWR has two fire regime classes.

For the grasses the fire regime is II.

The hardwood forests have a regime of III.

e. Potential Fire Behavior -

The following fire behavior outputs are based on the average conditions found during a normal fire season using the 14:00 weather observations. These averages ranges include: temp – 55-70 degrees Fahrenheit, relative humidity – 25%-35%, mid-flame wind speed of 6 mph, and 6% average 1hr (< 1/4 “ diameter) fine dead fuel moisture. The slope is 0 to 2% and the rate of spread is for a head fire. The outputs are calculated from the BEHAVE - Fire Behavior Prediction Models (v. 2.2) algorithms. (Attachment C)

Fuel Model 1 (A) 40% - Field Grasslands: Fire spread is governed by the fine and continuous herbaceous fuels that have cured or are nearly cured. Fires are surface fires that move rapidly through the cured grass and associated material. The fire behavior is directly related to the fuel moisture and windspeed. Fuel loading is 0.74 tons/acre and consists of 1/4" or smaller (1 hr) dead fuel component. Spot fires are generally not produced because fuels are consumed too quickly and thoroughly. Resistance to control is low to moderate, depending on windspeed. The behavior output includes:

Rate of Spread - 135 chains/hr (1.7 mph)

Flame Length - 5.4 feet

Fuel Model 3 (N) 60% - Field Grasslands: Fires in this model display high rates of spread under the influence of wind. Wind may drive fire into the upper heights of the grass and across standing water. Stands are tall, averaging about 3' to 6', but considerable variation may occur. Approximately 1/3 or more of the stand is considered dead or cured and maintains the fire. Fuel loading is 3.0 tons/acre and consists of up to 1/4"-1" and 10 hr) dead fuel component. Fire behavior is directly related to the fuel moisture and windspeed. Short-range (up to 100') spotting usually occurs and causes high to extreme control problems. The behavior output includes:

Rate of Spread – 148.4 chains/hr (1.9 mph)

Flame Length – 14.9 feet

Fuel Model 9 (E/R) - Deciduous Hardwood Forest: Fires are carried by dead, loosely compacted leaves and understory grasses. Wind tumbled leaves and torching trees may cause short to mid-range spotting that may increase the rate of spread above the predicted value. Fuel loading is 3.5 tons/acre and consists of <3" of dead and live fuel. Fire behavior is directly related to the fuel moisture and fuel loading with windspeed in exposed areas. Resistance to control is moderate except during drought conditions when extreme fire conditions are present. The behavior output includes:

Rate of Spread – 11.7 chains/hr (0.2 mph)

Flame Length – 3.4 feet

4. Management Considerations Affecting Operational Implementation

a. Safety

Firefighter and public safety (urban interface) is always of the highest priority when determining suppression strategy and tactics. No natural resource or property value is worth exposing humans to high risk situations. Fuels in the grasslands are light and flashy (models 3 and 1) and can pose a significant danger and is one factor of fatality fires.

b. Values at Risk

Once human safety is assured, the values to be protected play into the decision of the strategy and tactics to be employed. The most significant values at risk are the adjacent private properties. These properties include multiple single homes, a large horse facility, Town of Shawangunk Recreation area, refuge structures and improvements, and wildlife habitat.

c. Protection of Resources

Natural and cultural resources will be protected to the maximum extent feasible, but their protection will not be the highest priority. Appropriate suppression action will first and foremost ensure firefighter and public safety. When no threat to human life or damage to improvements and private property exists, protection of natural and cultural resources from fire or suppression damage will be the next highest priority. Foam suppressants or retardants should not be used within 300 feet of waterways to protect various water related resources. If new natural or cultural resources of concern are discovered during fire suppression activities, the Refuge Manager/Resource Advisor will ensure, to the extent appropriate and possible, their protection from damage related to fire suppression activities. The Refuge Manager will consult with the Regional Historic Preservation Officer to avoid, minimize, or mitigate potential or actual damage to cultural resources.

d. Wildlife:

Wildlife will be protected to the maximum extent feasible, but their protection will not be the highest priority. Appropriate suppression action will first and foremost ensure firefighter and public safety. When no threat to human life or damage to improvements and private property exists, protection of natural and cultural resources from fire or suppression damage will be the next highest priority. Once these concerns are protected, wildlife will be protected to the extent possible. Both birds and reptiles nest on the refuge and the areas in which the nests occur will be protected to the extent appropriate and possible. The adult birds would fly away, but the eggs and chicks still in the nests would be vulnerable to fire. Adult and hatchling turtles would most likely be in or near the water resources on the refuge, but again, the eggs in the nests would be vulnerable to the heat from the fire. Nesting for all of these species occurs primarily in spring and summer months. Mammals also breed on the refuge, but they would hopefully be able to move their young out of danger. The Refuge Manager and Wildlife Biologist would advise the Incident Commander of the areas of concern.

e. Minimum Impact Suppression Tactics Guidelines (MIST)

All personnel involved with fire management are expected to have an understanding of minimum impact suppression tactics. Suppression efforts can sometimes cause more resource damage than the actual fire. Efforts to minimize resource damage must be a consideration with all suppression actions and shall be outlined in the cooperative agreements or delegation of authority. As a general rule, the assigned Incident Commander, with the input from a resource advisor, while minimizing the threat to human life and property will evaluate the suppression resource needs and seek alternatives to mechanized equipment, limit soil movement, maintain natural water courses, and minimize land degradation. Further guidelines can be found in the Fire Management Handbook, FM 3.2.6.

The Resource Advisor should be an employee with resource management knowledge to advise the IC on issues related to mitigating the affects of suppression operations on cultural and natural resources.

f. Air Quality

Visibility and clean air are valued natural resources for Shawangunk Grasslands NWR and the protection of them will be given full consideration in fire management planning and operations. The station will comply with all applicable federal, state, and local air pollution control requirements, as specified within Section 118 of the Clean Air Act, as amended (42 USO 7418). Further guidance is in the Services Fire Management Handbook.

Shawangunk Grasslands NWR has not been designated as a Federal area where visibility is an important issue (Federal Class I Area) under the Clean Air Act Amendments of 1977. Smoke issues must be considered during the planning and implementation of any burn projects to lessen the potential impact to the surrounding community and area.

g. Access

Vehicular access to Shawangunk Grasslands is possible to most areas of the refuge. Before sending vehicles off the main access road or trails (old runways), ground conditions need to be assessed and considered in the initial size-up. Areas off the roads can be wet or not support heavy vehicles, tracked low ground pressure vehicles or indirect tactics should be considered.

h. Barriers

Barriers to fire spread exist on the refuge as roads, trails (old runways), wetland, and fuel type changes and can be used effectively to hasten construction of control lines and minimize the impacts of constructed lines. Barriers can also be used effectively for indirect attack, as a safe location to make a stand or as a secure place to burn out by removing fuels in front of an advancing fire.

i. Cost

The Refuge Manager with input from the Zone Fire Management Officer or Incident Commander should weigh the relative costs of various suppression and fuel treatment strategies in comparison to values at risk, being sure not to compromise safety concerns. Too many resources on an incident can elevate the costs unnecessarily. Aircraft can be an effective resource under some circumstances, but may also be unnecessary or ineffective in many situations and can greatly escalate the cost of suppression operations. The Zone FMO should be consulted prior to the major expenditures of fire operation funds.

Wildland Fire Suppression actions require a cost code from FIRECODE. Those numbers will be generated by the Zone FMO and activated by the Denver Finance Center.

The Refuge manager is responsible to assure the costs of all fire operations are properly spent and accounted for through the Federal Financial System (FFS) and Budget Tracking System (BTS) accounting systems. A quarterly expenditure report should be submitted to the Zone FMO for tracking and accountability of fire operation funds.

j. Regional and National Concerns

The regional preparedness level tends to follow the national preparedness level unless the eastern seaboard is experiencing very dry conditions and a high potential for wildfire. Expect normal refuge operations to occur through National Preparedness Level IV.

At National Preparedness Level V, when local fire conditions permit, and subject to supervisory approval, all qualified individuals should be made available to meet regional and national needs.

IV. Wildland Fire Management Program Components

The full range of fire management program elements were reviewed and considered when developing this fire management plan. These include wildfire suppression (and with it the associated elements of preparedness, training, prevention, and detection), wildland fire use, prescribed fire, non-fire fuel applications, and emergency rehabilitation and restoration. As outlined in III.C, Shawangunk Grasslands will implement the following elements:

- Wildland Fire – Full Suppression.
- Prescribed Fire - Intentionally igniting fire under carefully controlled conditions and according to an approved plan, to achieve a management objective.
- Hazard Fuels Reduction - Reduction of fuel accumulations around structures or other values at risk by mechanical, herbicide, or fire means.

A. Wildland Fire Suppression

1. Suppression/appropriate management response.

All Wildland fire regardless of cause will be suppressed. The local incident commander will determine the appropriate response based on local and FWS policies.

Collaboration with the NYDEC – Forest Rangers and Shawangunk Valley VFD will be utilized for suppression operations on the refuge with procedures for the responding agencies to report the incident to the Refuge Manager at the Wallkill River NWR office. All suppression efforts will be dictated by the following priorities:

- Life and Safety
- Refuge Resources and Property

Although resource impacts of suppression alternatives always must be considered in selecting a fire management strategy, resource benefits will not be the primary consideration. Appropriate suppression action will be taken to ensure firefighter safety, public safety, and protection of the resources.

Suppression strategies should be applied so that the equipment and tools used to meet the desired objectives are those that inflict the least impacts upon the natural and cultural resources.

Minimum impact suppression tactics (MIST) will be employed to protect all resources. Natural and artificial barriers will be used as much as possible for containment. When necessary, fire line construction will be conducted in such a way as to minimize long-term impacts to resources.

2. Preparedness.

a. Readiness

The Refuge staff should meet with area fire department personnel semi-annually to review cooperative agreements, contact information, and fire suppression policies and procedures. Meet with the Zone FMO yearly to review and update fire management activities, plans, and updated fire program information.

(1) Cooperative Agreements

Agreements are being written with the NYDEC and Shawangunk Valley VFD to provide protection for the refuge wild lands. These agreements will be reviewed annually to ensure currency.

- Updated costs for equipment and personal.
- Update phone contact numbers.
- Review communications and assigned frequencies.
- Coordinate prescribed burn schedule.

(2) Community assistance and grant programs (RFA)

The Shawangunk VFD will be notified of any program opportunities, deadlines, and procedures.

(3) Pre-Attack Plan

Pre-attack planning data will be updated annually by the refuge fire staff. Pre-attack plans will be placed the Zone Engine, the Fire Management Office, and at the Refuge Headquarters. A copy of the plan will be forwarded to the Shawangunk Valley VFD. Pre-attack plans should include:

- Response map(s): roads, gates, trails, water sources.
- Mutual aid zones / fire cooperator districts (include map with boundaries).
- Hazard/Risk map: rivers and streams, power lines, main ditches and canals.
- Natural and Cultural Resources map: sensitive zones, non-sensitive zones, restricted vehicle access areas.
- Structure list.

b. Step-Up Actions

Due to the low level of fire occurrence, the lack of historic archived weather data upon which to calculate NFDRS indices and breaking points, the preparation of a site specific step-up plan is not essential. However, a calculation of NFDRS indices and step-up plan break points is implemented throughout the Central Fire Management Zone. (section III D 4 c.) (Attachment D).

c. Detection

Most fires on the Refuge will be discovered and reported by local residence and members of the public using the area for recreation. These may or may not be reported directly to the Refuge Manager; it is expected that often the individual will contact the local fire department or 911 directly and Refuge staff may not find out about the fire until after it has already been attacked.

Response and coordination will be a part of the cooperative agreements with the NYDEC and Shawangunk Valley VFD. Contact and response information will be a part of the agreement process as well as the delegation of authority.

d. Communication

Inter-Refuge - The refuge radio system is the primary communication link. This is linked to the Delaware Water Gap NRA and the Wallkill River NWR Office. Cell phones will be used as a back-up to the radio system. During fire operations, radios will be issued to the overhead staff and at least 1 radio to each crew.

Interagency - Most of the local agencies have capability to communicate using a local frequency. For those local cooperators that do not have that capability, a Service radio will be provided and cell phone information exchanged to ensure communication during the incident.

e. Prevention and community education

Human caused fires have the potential to be the most damaging because they can occur at a time of the year when fewer initial attack resources are available and fuels are drier

Due to the low occurrence of natural fire starts in the Hudson River and Catskill Regions of NY, it is assumed that most of the fires in the area are human caused. No documented fire history exists for the Shawangunk Grasslands prior to and after FWS acquisition.

Fire prevention programs will be a collaborative effort with the NYDEC-Forest Rangers and Shawangunk Valley VFD to protect human life and property, and prevent damage to natural and cultural resources or physical facilities. Public outreach using bulletin board materials, handouts, and interpretive programs should be utilized to increase visitor and neighbor awareness of fire hazards. Trained employees need to relate to the public the beneficial effects of prescribed fires as opposed to unwanted human-caused fires, with emphasis on information, essential to understanding the potential severity of human-caused wildland fires and how to prevent them.

It is essential that employees be well informed about fire prevention and the objectives of the refuge's fire management program. Further, employees must be kept informed about changes in existing conditions throughout the fire season.

During periods of extreme or prolonged fire danger emergency restrictions regarding refuge operations or area closures may become necessary. Such restrictions, when imposed, will be consistent with those implemented by the Local and State Fire Officials. Closures will be authorized by the Refuge Manager.

f. Training & Qualifications

The Refuge will conform strictly to Service-specific guidelines as well as the National Wildfire Coordinating Group (NWCG) Publication 310-1, "Wildland and Prescribed Fire

Qualification System Guide” (January 2000). Service employees participating in any wildland fire activities on Fish and Wildlife Service lands must meet these requirements as well as those for fitness, and personal protective equipment (PPE). More information about training, fitness and PPE is provided in Chapter 1.5 of the FWS Fire Management Handbook, and the Central Zone Fire Management Officer at Wallkill River NWR. Consult with the Zone FMO on arranging fire training for Refuge staff.

The Refuge relies on Shawangunk Valley VFD for initial attack response, and all department members may not meet NWCG standards. The Shawangunk Valley VFD is in the process of training their members to the NWCG standards through the NYDEC-Forest Rangers. This will not be a limiting factor for the first burning period of initial attack, as Federal agencies have agreed to honor the qualifications standards of assisting entities during this initial phase. Should the fire extend into additional burning periods, then by policy, all suppression personnel will need to meet NWCG standards.

g. Aircraft operations

All aircraft operations, other than initial attack, will follow the interagency aircraft use regulations and policies. During initial attack the closest resource including state owned aircraft may be used. After the first burn period or if needed for extended attack contractors must be used.

Aircraft used in prescribed fire and non-fire treatments will meet the interagency standards and aircraft use plan will be required as part of the project plan.

3. Initial Attack

All wildland fires will be suppressed with fire fighter and public safety as the highest priority. Fires will be suppressed in a prompt, safe, aggressive, and cost-effective manner to produce smallest resource/acreage adverse impacts. Generally direct attack is the most cost effective tactic, provided it can be done safely. Otherwise indirect tactics are necessary, as determined by the Incident Commander (IC). In most cases, the Shawangunk Valley VFD will be the primary initial attack responder to wildfires on Refuge as covered under the Cooperative Agreements.

a. Refuge Response

Once notified of a fire the Refuge Manager or designee will contact the Shawangunk Valley VFD with a request to respond or confirmation of response. The Refuge Manager or designee will also inform the Zone FMO. Qualified and available refuge staff should respond as well, performing such tasks as securing the fire origin, fire suppression, checking for visitors at risk, and implementing public closure at the scene. If the fire threatens to burn outside the Refuge boundary, the Manager and/or the Incident Commander will notify adjacent landowners.

b. Incident Commander

The Refuge will use the Incident Command System (ICS) as a guide for suppression organization. When the responding Fire Department arrives, the senior officer of that Department will serve as the Incident Commander responsible for the fire. The IC will brief the Refuge Manager on the location and status of the fire. The Refuge Manager will provide

pertinent details on location and protection of special natural or cultural resources. The Incident Commander will:

The Incident Commander will:

- Locate, size-up, and coordinate suppression actions, including briefing subordinates, directing their actions and providing work tools.
- Provide public and firefighter safety.
- Considering current and predicted fire conditions, assess need for additional suppression resources and estimate the final size of the fire. The potential for spread outside of the refuge should be predicted, as well as the total suppression force required to initiate effective containment action.
- Assess the need for law enforcement personnel for traffic control, investigations, evacuations, etc,
- Keep Refuge Manager informed
- Provide information to the Refuge Manager so that a fire report can be prepared and provided to the Zone FMO.
- Notify Refuge Manager when initial attack is not successful, so that planning for extended attack can begin and a Wildland Fire Situation Analysis (WFSA) can be developed for the next operational period.
- Other duties of the Incident Commander are described in the National Wildfire Coordinating Group Fireline Handbook.

c. Public Safety

Public safety will require coordination between all Refuge staff and the Incident Commander. Notices should be posted to warn visitors, areas may be closed, and traffic control will be necessary if smoke crosses roads. Where wildland fires cross or burn areas adjacent to the road, mopped up and felling dangerous snags will be completed. If needed, individuals not involved in suppression efforts may be evacuated.

4. Extended Attack

The IC will notify the Refuge Manager whenever it appears that a fire will exceed initial attack efforts, threaten Service/private lands, or when fire complexity will exceed the capabilities of command or operations. The Refuge Manager will be responsible for coordinating with the IC all extended attack actions including:

- Notifying the Zone Fire Management Officer
- Completion and daily review of a wildland fire situation analysis (WFSA)(Zone FMO to be contacted for software and participation)
- Assignment or ordering of appropriate resources
- Completion of Delegation of Authority (Attachment E)

5. Fire Investigation

After a wildland fire has been detected, responding personnel should be wary of suspicious individuals or vehicles. Personnel should not disturb a fire location in the event an investigation is needed. Personnel responding should attempt to locate and protect the probable point of fire origin and record pertinent information required to determine fire cause. They will be alert for possible evidence, protect the scene, and report findings to the Incident Commander. All suspicious fires will be promptly and efficiently investigated. Individuals should not question suspects or pursue the fire investigation unless they are commissioned law enforcement officers.

Personnel from other agencies may investigate wildland fire arson or fire incidents involving structures. All fire investigations should follow guidelines in section 4.1-2 of the Services Fire Management Handbook. The Central Zone Fire Management Officer should be contacted if needed.

6. Required Reporting

The Refuge Manager must report all wildland fires to the Central Zone Fire Management Officer, who will issue a project cost code number from the FIRECODE system and add the fire to the Fire Management Information System (FMIS). The Incident Commander will be responsible for documenting decisions and completing a fire report (e.g., ICS-214, Agency Wildland Fire Report). Fire reviews will be documented and filed with the final fire report (Attachment F). The Zone Fire Management Officer will retain a copy and will be responsible for additional required reports such as an annual regional fire summary report and meeting national fire performance measures. This report will document fires by type, acres burned by fuel type, cost summary, personnel utilized, and fire effects.

B. Wildland Fire Use

As mentioned previously under section III.C, Wildland fire use is not considered a viable management option.

C. Prescribed Fire

1. Objectives

Shawangunk Grasslands National Wildlife Refuge has identified prescribed burning as part of the overall management of the resources. The prescribed fire activity is established and coordinated yearly as part of each Refuge's Habitat Management Plan. The use of prescribed fire to remove excess vegetation in grasslands and hardwood forests creates a mosaic that reduces fuel loading while providing quality habitat desirable for many wildlife species.

- Hazard fuel reduction should occur within or near wildland urban interface, refuge development zones, sensitive natural resources, and boundary areas are used to reduce the risk from wildland fire and to the greatest extent possible hazard fuel burns should compliment habitat/resource management objectives. Goals of hazard fuel reduction prescribed burning include:
 - Establish defensible space along urban interface boundary and around refuge improvements and structures.
 - Protect habitat from wildfire trespass.

- Maintain fuel loadings within the natural ranges (determined by fuel type).
- Aid in control of invasive plants and weeds that contribute to the fuel load.

2. Annual Preparation

The Refuge Manager, in consultation with the Wildlife Biologist and Zone Prescribed Fire Specialist or Fire Management Officer will formulate the annual prescribed fire program. The results of this planning effort will be:

- The designation of Burn Units.
- The preferred treatment interval (this can vary by fuel type).
- The recommended method of treatment (fire, fire/mechanical/chemical, etc).
- The recommended treatment sequence (rotation).
- The annual target acreage scheduled for treatment.
- The total target acreage to be treated annually refuge-wide.
- Type of monitoring and frequency needed.

The Zone FMO/Prescribed Fire Specialist or Burn Boss will write individual prescribed fire plans for the units to be treated.

Prescribed fire plans are submitted to the NYSDEC-Forest Rangers for review. Due to the review process, plans should be submitted as early as possible. Following the review, the NYSDEC-Forest Rangers will issue a burn permit. A smoke management plan is required by the State and the prescribed fire plans include adequate information to meet the State requirement. The Air Quality permit is issued as part of the prescribed fire permit.

3. Recommended Fire Qualified Staffing

The Zone Fire Management Officer or Prescribed Fire Specialist shall assign the Burn Boss of the appropriate level to implement the burn. The Burn Boss will follow all the guidelines and procedures that are contained in the prescribed fire plan.

Shawangunk Grasslands is an unstaffed satellite of the Wallkill River NWR

Position	Location	Minimum Qualifications
Fire Management Officer and/or Prescribed Fire Specialist	Zone	RXB2 or 1, TFLD, ICT3
Burn Boss	Zone	RXB3, FFT1

The Refuge will meet or exceed standard and qualification requirements as outline in Service Fire Management Handbook and Interagency prescribed fire qualification (NWCG publication 310-1). The Refuge Manager, with consultation from the Zone Fire Management Officer/Prescribed Fire Specialist, will be responsible for ensuring Refuge personnel maintain the qualifications necessary to implement the growing fire program.

4. Sensitive Resource Considerations (T&E, Cultural Resources, Smoke targets, etc.)

There are two critically important constraints/limitations to consider, when prescribing fire as a habitat management tool for the refuge:

- Fire is not recommended as a tool on the site in areas of extensive invasion of Purple Loosestrife. According to Malecki and Rawinski (1985) and Malecki (pers. communication), fire does not carry through PL and does not affect belowground tissues. Thompson (1987) reports that prescribed spring fire at Montezuma Refuge resulted in less than 10% plant mortality. More importantly, Purple Loosestrife requires bare substrate for germination. In areas infested with the invasive plant, up to 38,090 seeds can exist per square foot, in the top 2 inches of soil (Welling and Becker 1990). Since PL seeds are viable for 2 or more years, prescribed fire would likely provide a substrate for extensive PL germination at Shawangunk NWR. If, however, the Refuge has made/makes significant progress in controlling/eradicating Purple Loosestrife in the open habitats on the site, then fire may be a viable tool for controlling woody plant invasion, and maintaining grassland cover.
- As previously mentioned, the silt loam soils observed on-site, especially in “pit and hummock” wetlands, can be compacted easily by heavy equipment, and potentially rendered less suitable for the rare grassland/wetland plants documented on the Refuge. Therefore, any work requiring heavy equipment, such as mowing, constructing firebreaks, etc. should be done with low ground-pressure vehicles, when the site is extremely dry.

5. Prescribed Fire Plan and Prescription Requirements

Prescribed fire plan contents are provided in Chapter 2.1.3 of the FWS Fire Management Handbook. All burn plans must be reviewed and signed by the designated Burn Boss and the Regional Fire Management Branch Chief prior to Refuge Supervisor approval.

6. Required Reporting

a. Reporting and Documentation

The Refuge Manager will report all prescribed fires to the Zone FMO who will add the fire to the Fire Management Information System (FMIS) and the National Fire Plan Operations and Reporting System (NFPORS). The burn boss will be responsible for providing input to and documenting decisions for completion of the fire report (e.g., ICS-214, Agency Wildland Fire Report). Fire reviews will be documented and filed with the final prescribed fire report.

The Zone Fire Management Officer will retain a copy and be responsible for additional required reports such as an annual regional fire summary report and meeting national fire performance measures. This report will document fires by type, acres burned by fuel type, cost summary, personnel utilized, and fire effects.

b. Cost Accounting

All prescribed fire costs will be tracked using the Specific fire project code generated from the FMIS and opened from the Denver finance Center. The Wallkill River Refuge Manager will be responsible to accurately track and document the costs and expenditures associated with the prescribed burn. The refuge manager will keep the Zone Fire management Officer informed as to the expenditures and costs for inclusion in the annual regional fire management summary report and meeting national fire performance measures.

D. Non-Fire Fuel Applications (mechanical/chemical)

1. Objectives

Shawangunk Grasslands National Wildlife Refuge has identified mechanical and chemical applications as part of the overall management of the resources. The activities are established and coordinated yearly as part of each Refuge's Habitat Management Plan. The use of non-fire activities is to remove excess vegetation in grasslands and hardwood forests creates a mosaic that reduces fuel loading while providing quality habitat desirable for many wildlife species.

Hazard fuel reduction should occur within or near wildland urban interface, refuge development zones, sensitive natural resources, and boundary areas are used to reduce the risk from wildland fire and to the greatest extent possible hazard fuel treatments should compliment habitat/resource management objectives. Goals of non-fire hazard fuel reduction include:

- Establish defensible space along urban interface boundary and around refuge improvements and structures.
- Protect habitat from wildfire trespass.
- Maintain fuel loadings within the natural ranges (determined by fuel type).
- Aid in control of invasive plants and weeds that contribute to the fuel load.

2. Annual Preparation

The Refuge Manager, in consultation with the Wildlife Biologist and Zone Prescribed Fire Specialist or Fire Management Officer will formulate the long term non-fire treatment program.

Following the approval, the planning team will designate units and a long-term treatment strategy will be developed. The results of this planning effort will be:

- The designation of units (priority to urban interface).
- The preferred treatment interval (this can vary by fuel type).
- The recommended method of treatment (fire/mechanical/chemical, etc).
- The recommended treatment sequence (rotation).
- The annual target acreage scheduled for treatment.
- The total target acreage to be treated annually refuge-wide.

3. Restrictions

- a. Any work requiring heavy equipment, such as mowing, constructing firebreaks, etc. should be done with low ground-pressure vehicles, when the site is extremely dry.
- b. Seasonal

The only time that non-fire treatments will be affected is during the nesting season from early may to early July. During that time no unnecessary activity should occur.

4. Required Reporting

a. Documentation and Reporting

The Refuge Manager will report all non-fire treatments to the Zone FMO who will add the information to the Fire Management Information System (FMIS) and the National Fire Plan Operations and Reporting System (NFPORS). The project manager will be responsible for providing input to and documenting decisions for completion of the treatment report (e.g., ICS-214, Agency Wildland Fire Report).

The Zone FMO will retain a copy and be responsible for additional required reports such as an annual regional fire summary report and meeting national fire performance measures. This report will document treatment by type, acres treated by fuel type, cost summary, personnel utilized, and effects.

b. Cost Accounting

All non-fire treatment costs will be tracked using the Specific fire project code generated from the FMIS and opened from the Denver finance Center. The Wallkill River Refuge Manger will be responsible to accurately track and document the costs and expenditures associated with the treatment. The refuge manager will keep the Zone FMO informed as to the expenditures and costs for inclusion in the annual regional fire management summary report and meeting national fire performance measures.

E. Emergency Rehabilitation and Restoration

Post-fire repairs will fall into one of three categories: fire suppression activity damage, emergency stabilization, and rehabilitation (620 DM 3). Fire suppression activity damage is damage to resources, lands, and facilities resulting from wildland fire suppression actions, in contrast to damages resulting from the fire itself. Repair actions are planned and performed primarily by the suppression incident organization as soon as possible prior to demobilization. The incident management team, during transition back to the local unit, must document the fire suppression activity damage repair actions accomplished and those which are still needed. Fire suppression activity damage is paid by the same Wildland Fire Suppression Operations subactivity (9141) and project code as the fire suppression effort.

Emergency stabilization may be defined as planned actions to stabilize and prevent unacceptable degradation to natural and cultural resources, to minimize threats to life or property resulting from the effects of a fire, or to repair/replace/construct physical improvements necessary to prevent degradation of land or resources. Emergency stabilization actions must be taken within one year following containment of a wildland fire. Stabilization actions must be documented in an approved plan which will describe in detail the actions proposed and costs, provision for monitoring of results, delineation of funding, and responsibilities for implementation. Funding is provided under the Wildland Fire Suppression Operations account, but using a different subactivity (9142, Emergency Stabilization) than suppression only. Funding up to \$500,000 may be approved at the Regional Director level. Larger requests must be approved by the Director. Examples of emergency stabilization actions that may be permitted include replacing or repairing minor facilities essential to public health and safety when no other options are available; placing structures to slow soil and water movement; stabilizing

soils; increasing road drainage frequency and/or capacity to handle additional post-fire runoff; installing protective fences or barriers to protect treated or recovering areas; seeding to prevent establishment of invasive plants, and direct treatment of invasive plants; using integrated pest management techniques to minimize the establishment of non-native species within the burned area; and monitoring of treatments and activities for up to three years.

Rehabilitation efforts are undertaken within three years of containment of a wildland fire to repair or improve fire-damaged lands unlikely to recover naturally to management approved conditions, or to repair or replace minor facilities damaged by the fire. These are long-term actions that have been already identified in approved land management plans. A rehabilitation plan will be written as a separate plan, independent of an emergency stabilization plan. Funding must be approved on a priority basis by the National Burned Area Emergency Rehab (BAER) Coordinators in consultation with the Office of Wildland Fire Coordination. Funds will fall under a burned area rehabilitation subactivity, not the Wildland Fire Operations account. Allowable actions may include chemical, manual, and mechanical removal of invasive species, and planting of native species to restore or establish a healthy, stable ecosystem; tree planting to reestablish burned habitat, reestablish native tree species lost in fire, and prevent establishment of invasive plants; and repair or replace fire damage to minor operating facilities such as campgrounds, interpretive signs and exhibits, and fences.

V. Organization and Budget

A. Fire Management Team Responsibilities

- **Refuge Manager:** The Refuge Manager is responsible for the full range of management duties within the Refuge including fire management activities that implement an effective fire management program. Appropriate action will be taken by the Refuge Manager for fires on or adjacent to Refuge lands. Related fire management activities include delegation of authority, designation of resource advisors on incidents, implementing extended initial attack organizations, developing cooperative agreements with local fire departments and state agencies, and authorizing the use of vehicles and heavy equipment within designated resource sensitive areas of the Refuge.
- **Refuge Wildlife Biologist:** Acts as Resource Advisor on initial and extended attack or project size wildfires.
- **Regional Fire Management Branch Chief (RFMC):** Provides coordination, training, evaluation, and technical guidance, as requested, to the Refuge staff, approves fire preparedness and fuels treatment budget requests. The RFMC will be informed of all wildfire suppression activity occurring on the Refuge through the Zone FMO.
- **Zone Fire Management Officer (Zone FMO):** The Region 5 Central Zone FMO, stationed at Wallkill River National Wildlife Refuge, advises the Refuge Manager or staff on matters relative to fire planning, fire preparedness, suppression, and prescribed burning. The Zone FMO supplies technical assistance and experience relative to fire management activities and also advises the Refuge Manager on priorities, strategies, and tactics to reduce adverse fire impacts. The Zone FMO coordinates fire training for Refuge staff, enters fire reports into the computerized database, maintains staff qualifications through the IQCS system, and enters Refuge base information and

requests into the FireBase/Fire Program Analysis (FPA) workload analysis and budgeting systems. The Zone FMO makes recommendations to the Regional Fire Management Branch Chief on fire budget allocations to the Refuge and provides guidance to the refuge on proper fire expenditures. The ZFMO may be called upon to gather additional resources necessary to implement this Plan.

B. Budget

1. Refuge Fire Funding

No fire funds are specifically earmarked to conduct fire management activities at Shawangunk Grasslands NWR. Funds can be requested to meet wildland urban interface/hazard fuel treatment, prevention, or minor equipment and personal protective equipment needs through the Zone FMO on an annual basis. Other funds from regional fire program sources are available to cover training associated travel and physical exams. In addition, costs of emergency suppression to local cooperators are reimbursable from the national fire management emergency operations fund. Cooperating fire departments close to the Refuge serve to meet suppression needs and suppression objectives of this Plan.

2. Fire Program Analysis (FPA)

Fire Program Analysis (FPA) is an interagency fire management workload analysis and budgeting system that will replace the existing FireBase system beginning in fiscal year 2009. All federal land ownerships within a given Fire Planning Unit (FPU) will be subject to a common optimization model that will determine optimum levels of resources by unit for a given funding level. Inputs to the system and running of the optimization model will take place during the remainder of fiscal year 2004 and 2005. Shawangunk Grasslands NWR is part of the Northeast Compact FPU which includes all National Park Service, Forest Service, and Fish & Wildlife Service land in New England and NY. It is unknown at this time what effect, if any, FPA will have on allocation of fire resources to Shawangunk Grasslands and other area refuges.

VI. Monitoring and Evaluation

The following Fire Research is needed at Shawangunk Grasslands NWR:

- Comprehensive inventory and assessment of the Refuge's hazard fuels, and the identification and prioritization of hazard fuel units.
- Assessment of hazard fuel management options, and their effects upon Refuge resource objectives
- Assessment of long and short term fire effects in the habitats of the Refuge with recommendations for treatment activities.
- Assessment of treatment affects monitoring needs and preparation of monitoring plan.

A. Monitoring and Research

The effects of fuel treatments upon the Refuge's plant and animal population's needs to be better understood. Through applied research and careful application non-fire treatments, data collected can

provide managers with a better understanding of the natural ecological effects, and the information needed to refine treatment types to meet resource objectives.

Monitoring will comply with accepted scientific methods. This data, along with information gathered through research studies, will be used to improve the effectiveness of the fire management program. Levels of data collection, from least expensive and intensive to the most elaborate, are as follows:

- Minimum levels (photopoints)
- Intermediate (NPS Fire Effects Monitoring Handbook)
- Volume/weight removed measurements
- Maximum levels – integrate with other refuge monitoring programs to support adaptive management.

B. Evaluation

1. After Action Review

Wildland and Prescribed fire activities will be evaluated by the IC and the Refuge Manager in the form of an After Action Review (AAR) as outlined in the Incident Response Pocket Guide.

2. Significant Wildland Fire Event Review

The Regional Fire Management Branch Chief, Refuge Manager, Incident Commander, and Zone FMO will conduct formal fire reviews in the event of as outlined in the FWS FMHB 3.6

- significant injury/accident
- significant property or resource damage
- significant safety concerns

3. National Wildland Fire Performance Measures

The Refuge Manager and Zone FMO will conduct a yearly review of the overall fire management program. The review will cover project funding and expenditures, non-fire treatment accomplishments, and program review. This information will be compiled for inclusion in the yearly Regional Fire Management Government Performance Results Act (GPRA) goals.

Definitions

Agency Administrator. The appropriate level manager having organizational responsibility for management of an administrative unit. May include Director, State Director, District Manager or Field Manager (BLM); Director, Regional Director, Complex Manager or Project Leader (FWS); Director, Regional Director, Park Superintendent, or Unit Manager (NPS), or Director, Office of Trust Responsibility, Area Director, or Superintendent (BIA).

Appropriate Management Action. Specific actions taken to implement a management strategy.

Appropriate Management Response. Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

Appropriate Management Strategy. A plan or direction selected by an agency administrator which guide wildland fire management actions intended to meet protection and fire use objectives.

Appropriate Suppression. Selecting and implementing a prudent suppression option to avoid unacceptable impacts and provide for cost-effective action.

Bureau. Bureaus, offices or services of the Department.

Burning Index (BI). A number combining the spread and energy release component related to the contribution of fire behavior to the effort of containing a fire.

Class of Fire (as to size of wildland fires):

Class A - ¼ acre or less.

Class B - more than ¼ but less than 10 acres.

Class C - 10 acres to 100 acres.

Class D - 100 to 300 acres.

Class E - 300 to 1,000 acres.

Class F - 1,000 to 5,000 acres.

Class G - 5,000 acres or more.

Emergency Fire Rehabilitation/Burned Area Emergency Rehabilitation (EFR/BAER). Emergency actions taken during or after wildland fire to stabilize and prevent unacceptable resource degradation or to minimize threats to life or property resulting from the fire. The scope of EFR/BAER projects are unplanned and unpredictable requiring funding on short notice.

Energy Release Component (ERC). A number related to the available energy (BTU) per unit area (square foot) within the flaming front at the head of a fire. It is generated by the National Fire Danger Rating System, a computer model of fire weather and its effect on fuels. The ERC incorporates thousand hour dead fuel moistures and live fuel moistures; day to day variations are caused by changes in the moisture content of the various fuel classes. The ERC is derived from predictions of (1) the rate of heat release per unit area during flaming combustion and (2) the duration of flaming.

Extended attack. A fire on which initial attack forces are reinforced by additional forces.

Fire Suppression Activity Damage. The damage to lands, resources and facilities directly attributable to the fire suppression effort or activities, including: dozer lines, camps and staging areas, facilities (fences, buildings, bridges, etc.), handlines, and roads.

Fire effects. Any consequences to the vegetation or the environment resulting from fire, whether neutral, detrimental, or beneficial.

Fire intensity. The amount of heat produced by a fire. Usually compared by reference to the length of the flames.

Fire management. All activities related to the prudent management of people and equipment to prevent or suppress wildland fire and to use fire under prescribed conditions to achieve land and resource management objectives.

Fire Management Plan. A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational procedures such as preparedness plans, preplanned dispatch plans, prescribed fire plans and prevention plans.

Fire prescription. A written direction for the use of fire to treat a specific piece of land, including limits and conditions of temperature, humidity, wind direction and speed, fuel moisture, soil moisture, etc., under which a fire will be allowed to burn, generally expressed as acceptable range of the various fire-related indices, and the limit of the area to be burned.

Fuels. Materials that are burned in a fire; primarily grass, surface litter, duff, logs, stumps, brush, foliage, and live trees.

Fuel loadings. Amount of burnable fuel on a site, usually given as tons/acre.

Hazard fuels. Those vegetative fuels which, when ignited, threaten public safety, structures and facilities, cultural resources, natural resources, natural processes, or to permit the spread of wildland fires across administrative boundaries except as authorized by agreement.

Initial Attack. An aggressive suppression action consistent with firefighter and public safety and values to be protected.

Keetch - Byram Drought Index (KBDI). An indicator of drought on the availability of fuel to burn in the heavier fuels and litter and duff layers.

Maintenance burn. A fire set by agency personnel to remove debris; i.e., leaves from drainage ditches or cuttings from tree pruning. Such a fire does not have a resource management objective.

Natural fire. A fire of natural origin, caused by lightning or volcanic activity.

NFDRS Fuel Model. One of 20 mathematical models used by the National Fire Danger Rating System to predict fire danger. The models were developed by the US Forest Service and are general in nature rather than site specific.

NFFL Fuel Model. One of 13 mathematical models used to predict fire behavior within the conditions of their validity. The models were developed by US Forest Service personnel at the Northern Forest Fire Laboratory, Missoula, Montana.

Prescription. Measurable criteria which guide selection of appropriate management response and actions. Prescription criteria may include safety, public health, environmental, geographic, administrative, social, or legal considerations.

Prescribed Fire. A fire ignited by agency personnel in accord with an approved plan and under prescribed conditions, designed to achieve measurable resource management objectives. Such a fire is designed to produce the intensities and rates of spread needed to achieve one or more planned benefits to natural resources as defined in objectives. Its purpose is to employ fire scientifically to realize maximize net benefits at minimum impact and acceptable cost. A written, approved prescribed fire plan must exist and NEPA requirements must be met prior to ignition. NEPA requirements can be met at the land use or fire management planning level.

Preparedness. Actions taken seasonally in preparation to suppress wildland fires, consisting of hiring and training personnel, making ready vehicles, equipment, and facilities, acquiring supplies, and updating agreements and contracts.

Prevention. Activities directed at reducing the number or the intensity of fires that occur, primarily by reducing the risk of human-caused fires.

Rehabilitation. (1) Actions to limit the adverse effects of suppression on soils, watershed, or other values, or (2) actions to mitigate adverse effects of a wildland fire on the vegetation-soil complex, watershed, and other damages.

Spread Component (SC). A rating of the forward rate of spread of a head fire

Suppression. A management action intended to protect identified values from a fire, extinguish a fire, or alter a fire's direction of spread.

Unplanned ignition. A natural fire that is permitted to burn under specific conditions, in certain locations, to achieve defined resource objectives.

Wildfire. An unwanted wildland fire.

Wildland Fire. Any non-structure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Situation Analysis (WFSA). A decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economical, political, and resource management objectives as selection criteria.

Wildland/urban interface fire A wildland fire that threatens or involves structures.

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Consultation and Coordination

All fire management program activities will be implemented in cooperation and coordination with federal, state, county, and local agencies. The following individuals were contacted and contributed during the development of this plan:

- Allan Carter, RFMC – Region 5, U.S. Fish and Wildlife Service
- Michael Durfee, Region 5 Central Zone FMO, Wallkill River National Wildlife Refuge
- Steve Kahl, Refuge Manager, Shiawassee National Wildlife Refuge
- William Koch, Project Leader, Great Swamp, Wallkill River, Shawangunk Grasslands NWRC
- Kevin Holcomb, Refuge Biologist, Wallkill River National Wildlife Refuge
- Ed Henry, Refuge Manager, Wallkill River National Wildlife Refuge
- Laura Mitchell, Regional Fire Ecologist, Region 5, U.S. Fish and Wildlife Service

Attachment A: Cooperative Agreements

Cooperative Agreement No.:
DCN:
COST CODE:
COOPERATIVE AGREEMENT
BETWEEN
THE U.S. FISH AND WILDLIFE SERVICE
AND
THE TOWN OF SHAWANGUNK, NEW YORK

I. PURPOSE

This Cooperative Agreement is made and entered into by and between the U.S. Fish and Wildlife Service, hereinafter referred to as the “Service,” and the Town of Shawangunk for the Shawangunk Valley Volunteer Fire Department, hereinafter referred to as “Shawangunk FD,” under authority of the Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856a. and b.). The purpose of this Agreement is to facilitate cooperation between the two parties in the prevention, detection, and suppression of wildland fires on the Shawangunk Grasslands National Fish and Wildlife Refuge (hereinafter referred to as the “Refuge”) within the Town of Shawangunk and adjoining lands. The Service provides maximum protection for the Refuge, its lands, wildlife, personnel, and facilities from fire in compliance with 620 Departmental Manual 1.4.H. which states in part, that it is policy “to (1) protect human life and (2) property and natural/cultural resources . . . commensurate with fire management costs.” Likewise, the Shawangunk FD is responsible for providing the Town of Shawangunk with fire protection for its lands, citizens, and buildings

The objectives of this cooperative effort are to ensure that Shawangunk FD is authorized to: 1) suppress wildland fires on the Refuge; and, 2) cooperatively work with the Refuge to plan and implement prescribed fire for the purposes of managing fire risk.

This Agreement provides for the limited interchange of services, personnel, equipment, funds and facilities to achieve this goal.

II. SCOPE OF WORK

For the period hereinafter set forth, Shawangunk FD and the Service will jointly provide, to the extent practicable, necessary personnel, materials, services, facilities, funds, and otherwise perform all things necessary for, or incidental to, the performance of this Cooperative Agreement.

Specifically, the Shawangunk FD agrees to do the following.

- A. To provide, as is available, the qualified personnel and equipment necessary to suppress wildland fires on Refuge lands in the Town of Shawangunk, New York, under the direction of the Fire Chief or other superior officer of the Shawangunk FD and the supervision of the Refuge Manager or his designated representative.
- B. To notify the Refuge Manager when suppression equipment and personnel are not available for any wildland fire response on Refuge lands.

- C. To notify the Refuge Manager, as soon as practicable, when the Shawangunk FD is notified of a fire incident on the Refuge.

Specifically, the Service agrees to do the following.

- A. To provide, when available, the qualified personnel and/or equipment necessary and available for use, upon request by the Fire Chief, to suppress fires on Refuge lands.
- B. During wildland fire suppression activities on Refuge lands by the Shawangunk FD, to delegate the authority to the Shawangunk FD necessary to put the Fire Chief, or his designee, in command of the firefighting effort, in consultation with the local New York Department of Environmental Conservation Forest Ranger (NYDEC).
- C. Consult with the Shawangunk FD and local NYDEC Forest Ranger on prescribed fire projects on the Refuge.
- D. Provide funds to the Shawangunk FD as detailed in Appendix B, for cost reimbursement of fire suppression and any other fire management related activities authorized and approved by the Refuge Manager.

III. PERIOD OF AGREEMENT

This Cooperative Agreement will be effective for five years from the signature date of both parties. The Agreement may be modified, extended, or terminated in writing at any time by mutual consent of the parties hereto, or may be terminated by either party by giving 60 days written notice to the other party.

IV. FINANCIAL ADMINISTRATION

- A. If the Shawangunk FD requests reimbursement for specific actions or activities, it will submit to the Service statements of reimbursement, detailing what charges were incurred for specific items and units of work (see Appendix B for the rate schedule), for appropriate expenditures covered by this Agreement as necessary. Invoices will include the name and address of the Shawangunk FD, the project name, and the invoice amount. The Service will reimburse Shawangunk FD via Electronic Funds Transfer.
- B. Reimbursement of Shawangunk FD expenses by the Service will be contingent upon the availability of funds and shall not obligate the Service in the event of unavailability of funds resulting from failure to appropriate by the U.S. Congress.
- C. The Service and Shawangunk FD will annually agree on the rates of reimbursement for activities under this Agreement.
- D. The Service and Shawangunk FD will meet at least annually, prior to April 1, to review operations and planning. It is agreed that the Refuge Manager shall be responsible for setting a mutually convenient date, time, and place for said meeting.

V. PROJECT OFFICERS

Project Officers, for the purpose of administering this Agreement, including the receiving and reviewing of reports and the handling of termination notices are:

For the Service: William Koch, Refuge Manager
U.S. Fish and Wildlife, Service, Great Swamp NWR

For Shawangunk Valley VFD: Chief
Shawangunk Valley Volunteer Fire Department
Shawangunk, NY

VI. SPECIAL PROVISIONS

- A. Liability. Each party agrees that it will be responsible for its own acts and the results thereof and shall not be responsible for the acts of the other party and the results thereof. Each party, therefore, agrees that it will assume all risk and liability to itself, its agents or employees, for any injury to persons or property resulting in any manner from conduct of its own operations, and the operations of its agents or employees, under this Agreement, and for any loss, cost, damage, or expense resulting at any time from any and all causes due to any act or acts, negligence, or the failure to exercise proper precautions, of or by itself or its own agents or its own employees, while occupying or visiting the premises under and pursuant to this Agreement. Each party shall waive all claims against the other party for compensation for any loss, damage, personal injury, or death occurring as a result of or in consequence of the performance of this agreement.
- B. During the performance of this Agreement, the cooperatives agree to abide by the terms of Executive Order 11246 on non-discrimination and will not discriminate against any person because of race, color, religion, sex, or national origin. The cooperatives will take affirmative action to ensure that applicants are employed without regard to their race, color, religion, sex, or national origin.
- C. No member of, or delegate to the Congress, or resident Commissioner, shall be admitted to any share of this Agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this Agreement if made with a corporation for its benefit.
- D. It is hereby certified that Shawangunk FD and the Service will comply with all applicable Federal, State, and local laws, ordinances and regulations with respect to the care, handling, storage and disposal of any materials furnished by the Service or purchased as a result of this Agreement. It is further certified that Shawangunk FD is the user of such materials and is capable of complying with all applicable Federal, State, and local laws.
- E. This agreement and the obligations of the Service hereunder shall be subject to the availability of funding and nothing herein contained shall be construed as binding the Service to expend in any one fiscal year any sum in excess of appropriations made by Congress or administratively allocated for the purpose of this Agreement for the fiscal year, or to involve the Service in any contract or other obligation for the further expenditure of money in excess of such appropriations or allocations.
- F. Nothing herein contained shall be construed as binding the Shawangunk FD to expend any sum, or to involve the Shawangunk FD in any contract or other obligation for the further expenditure of money.

G. Lobbying with appropriated funds – No part of the money appropriated by any enactment of Congress shall, in the absence of express authorization by Congress, be used directly or indirectly to pay for any personal service, advertisement, telegram, telephone, letter, printed or written matter, or other device, intended or designed to influence in any manner a Member of Congress, a jurisdiction, or an official of any government, to favor, adopt, or oppose, by vote or otherwise, any legislation, law, ratification, policy or appropriation, whether before or after the introduction of any bill, measure, or resolution proposing such legislation, law, ratification, policy or appropriation; but this shall not prevent officers or employees of the United States or of its departments or agencies from communicating to Members of Congress on the request of any such Member or official, at his request, or to Congress or such official, through the proper official channels, requests for any legislation, law, ratification, policy or appropriations which they deem necessary for the efficient conduct of the public business, or from making any communication whose prohibition by this section might in the opinion of the Attorney General, violate the Constitution or interfere with the conduct of foreign policy, counter-intelligence, intelligence or national security activities. Violations of this section shall constitute violations of section 1352(a) of title 31.

VII. GENERAL PROVISIONS

This Agreement shall be subject to the following Appendices which are incorporated by reference herein:

1. Appendix A - 43 C.F.R. § 12
2. Appendix B- Certifications Regarding Debarment, Suspension and Other Responsibilities matters, Drug Free Workplace Requirements and Lobbying, DI-2010
3. Appendix C - Civil Rights Assurance, DI-1350 (See attachment A-1)
4. Appendix D – Schedule of Suppression Reimbursement

VIII. MODIFICATIONS

The scope of work and terms of Agreement may be modified or amended in writing at any time by mutual consent of the signatory parties.

IN WITNESS WHEREOF, the parties have executed this Cooperative Agreement on the day, month and year indicated:

Chief
Contracting and General Services
U.S. Fish and Wildlife Service
Region 5

Chair
Board of Selectmen
Shawangunk, New York

Fire Chief
Shawangunk Valley Fire Department
Shawangunk, New York

Date

Date

Date

Attachment A-2

SCHEDULE OF SUPPRESSION REIMBURSEMENT

The U.S. Fish and Wildlife Service will reimburse the Shawangunk Fire Department (Shawangunk FD), for services as listed below to be paid in half hour increments calculated from the time the suppression unit departs the station and until it returns. Equipment costs listed below do not include operators. In addition, upon return to the station, the Shawangunk FD will be reimbursed for personnel (only) time used to restore the responding equipment to proper readiness status. This schedule is updated annually (on or about April 1) and applies throughout the current year.

Engine Pumper	\$150.00 per hour
Tanker	\$100.00 per hour
Special Services Vehicles (support)	\$100.00 per hour
Ladder Trucks	\$200.00 per hour
Fire Officers	\$20.00 per hour
Personal Labor	\$15.00 per hour

Attachment B:

YEAR	WF	ACRES	RX	ACRES	HF/WUI	ACRES (m,c,f)
2002						250 (m)
2003						125 (m)
2004						200 (m)

* Hazard Fuel/Wildland Urban Interface Treatment Types (WUI) Codes - (m) - mechanical (c) - chemical (f) – fire

Attachment C: Behave Runs

Direct Inputs		Direct Outputs	
Dominant fuel model	3	Rate of spread (ch/hr)	148.4
Percent cover	100	Heat per unit area (Btu/ft ²)	742
Other fuel model	3	Fireline intensity (Btu/ft/s)	2,019
1-h fuel moisture (%)	6	Flame length (feet)	14.9
10-h fuel moisture (%)	9	Reaction intensity (Btu/ft ² /m)	2,900
100-h fuel moisture (%)	15	Effective windspeed (mph)	6
Herbaceous fuel moisture (%)		Direction of maximum spread (°)	135
Woody fuel moisture (%)			
Mid flame wind speed (mph)	6		
Cardinal wind direction (°)	NW		
Terrain slope (%)	0		
Aspect of slope (°)	SE		
Calc maximum spread rate	Yes		
Directions are relative to the Dir. for spread calculation (°)			

Direct Inputs		Direct Outputs	
Dominant fuel model	1	Rate of spread (ch/hr)	135
Percent cover	100	Heat per unit area (Btu/ft ²)	91
Other fuel model	3	Fireline intensity (Btu/ft/s)	224
1-h fuel moisture (%)	6	Flame length (feet)	5.4
10-h fuel moisture (%)	9	Reaction intensity (Btu/ft ² /m)	826
100-h fuel moisture (%)	15	Effective windspeed (mph)	6
Herbaceous fuel moisture (%)		Direction of maximum spread (°)	135
Woody fuel moisture (%)			
Mid flame wind speed (mph)	6		
Cardinal wind direction (°)	NW		
Terrain slope (%)	0		
Aspect of slope (°)	SE		
Calc maximum spread rate	Yes		
Directions are relative to the Dir. for spread calculation (°)			

Direct Inputs		Direct Outputs	
Dominant fuel model	9	Rate of spread (ch/hr)	11.7
Percent cover	100	Heat per unit area (Btu/ft ²)	370
Other fuel model	3	Fireline intensity (Btu/ft/s)	79
1-h fuel moisture (%)	6	Flame length (feet)	3.4
10-h fuel moisture (%)	9	Reaction intensity (Btu/ft ² /m)	2,391
100-h fuel moisture (%)	15	Effective windspeed (mph)	6
Herbaceous fuel moisture (%)		Direction of maximum spread (°)	135
Woody fuel moisture (%)			
Mid flame wind speed (mph)	6		
Cardinal wind direction (°)	NW		
Terrain slope (%)	0		
Aspect of slope (°)	SE		
Calc maximum spread rate	Yes		
Directions are relative to the Dir. for spread calculation (°)			

Attachment D: Step-up Plan

Daily fire danger indices will be compiled and averaged using the NFDRS stations located at Forsythe NWR in New Jersey and Prime Hook NWR in Delaware, then compared to the indices used by the NJ State Forest Fire Service.

Fuel Model R - May 15 to October 15

Adjective Class	KDBI	Burning Index
Low	<140	0 - 10
Moderate	141-260	11-15
High	261-380	16-20
Very High	381-500	21-25
Extreme	500+	25+

Fuel Model E - October 15 to May 15

Adjective Class	KDBI	Burning Index
Low	<140	0-30
Moderate	141-260	31-38
High	261-380	39-47
Very High	381-500	48-53
Extreme	500+	54+

PREPAREDNESS ACTIONS	STAFFING LEVELS		
	Low and Medium	High	Very High and Extreme
REFUGE STAFF/COLLATERAL FIREFIGHTERS			
Carry PPE with them while on duty (Including Nomex and boots)		X	X
May be assigned to an engine at a station or patrol			X
Work weeks and/or tours of duty may be extended			X
FIRE EQUIPMENT			
Engines in ready status (15 min or less)	0	1	1
FIRE PREVENTION ACTIVITIES			
Post fire danger signs at high public use areas			X
Restrict vehicles to paved/gravel parking areas, remain within boats and close select trails and public use areas			X
MISCELLANEOUS EMERGENCY PRESUPPRESSION ACTIONS			
Notify Zone FMO and open emergency preparedness account			X
Preposition FWS and interagency resources as needed			X

Attachment E: Delegation of Authority

Name of Incident Commander is assigned as Incident Commander of the *Name of Incident, Name of Refuge or Unit* for the US Fish and Wildlife, effective *Time and Date*.

The Incident Commander has full authority and responsibility for managing the fire suppression activities within the framework of the law and Fish and Wildlife Service policy and direction as provided by this office. The Resource Advisor will provide habitat Management Plans and other appropriate documents.

Names of Resources Advisors and contact Information are assigned as Resource Advisors. They or the Refuge Manager will be consulted in situations where natural resource decisions or trade offs are involved unless life safety issues require immediate attention and those actions will be documented.

Specific direction and fire suppression priorities for the *Name of Incident* are as follows, and are in priority order:

1. Provide for firefighter and public safety.
2. Use of minimal impact techniques should be employed to reduce habitat damage. Use natural barriers and roads if possible for burnout operations.
3. Use of dozers or tractors requires approval of the Refuge manager of their designate (resource advisors) prior to implementation.

Turn Back Standards

1. All *Name of Incident* contracts, agreements, bills, medical problems, equipment repairs, and fire cache re-supply shall be closed out prior to team being released.
2. Road or levee damage during suppression efforts will be repaired prior to the teams departure.
3. Fire perimeter mopped-up *Specify* and all lines checked for heat and integrity.
4. Rehabilitation Plan will be completed in Coordination with the Refuge Biologists and resource Advisors.
5. Fire perimeter mapped by GPS and loaded into the Refuges GIS Database.
6. Tort claims reviewed by Refuge Manager or their designee.

The Deputy Refuge Manager, Fire Program Manager, or their designate will represent the Refuge Manager on any occasion where Refuge Manager is not immediately available.

Refuge Manager, _____

Name of Refuge or Unit, Date and Time.

Attachment F: FMIS Wildland Fire Report

GENERAL TAB

- (1) Fire Type:
- (2) Org. Code:
- (3) Fire Name:
- (4) Discovery Date:
- (5) County: Code:
- (6) Cong. District:
- (7) Fire Subtype:
- (8) Measurement Method:
- (9) Ignition Owner:
- (10) Ignition State:
- (11) Ignition Cause:
- (12) WFSA? Yes or No
- (13) If WFSA = yes, Date:

- (14) Burn State:
Burn State:
- (15) Burn Owner:
Burn Owner:
- (16) Burn Acres:
Burn Acres:

- (17) Management Level:

- (18) Resource Type
- (19) Quantity
- Resource Type
- Quantity

Values at Risk

- (20) Type
- (21) Subtype

- (22) Discovery Date:
- (23) Time:
- (24) Initial Attack Date: (25) Time:
- (26) Control Date:
- (27) Time:
- (28) Out Date: (29) Time:

LOCATION TAB

- (30) Latitude:
- (31) Longitude:
- (32) Aspect:
- (33) Lay of Land:
- (34) Slope:
- (35) Position of Slope:
- (36) Elevation:
- (37) Special Area Type:

EMISSIONS TAB

- (38) Fire Danger Index:
- (39) Value:

FINAL TAB

- (40) Person Completing Form:
- (41) Title: _____
- (42) Date:
- (43) I.C.:
- (44) Narrative: